



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,590	09/29/2004	Dieter Kienzler	R.302528	5910

2119 7590 06/07/2006

RONALD E. GREIGG  
GREIGG & GREIGG P.L.L.C.  
1423 POWHATAN STREET, UNIT ONE  
ALEXANDRIA, VA 22314

EXAMINER

DOUGHERTY, THOMAS M

ART UNIT PAPER NUMBER

2834

DATE MAILED: 06/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/509,590

Applicant(s)

KIENZLER ET AL.

Examiner

Thomas M. Dougherty

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 12-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 12-27 and 30-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 12 and 13 indicate that the diaphragm is attached or welded to the actuator foot, however in each embodiment shown by the applicants, the diaphragm is connected or welded to the actuator head. Correction is required. Claim 30 indicates that the actuator head is welded to the diaphragm while undergoing a preload, which is the exact opposite of its parent claim 29, which indicates that the welding occurs without and load application.

Claim 27 is further rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 27 uses a narrower range within a broader range in the same claim which renders the claim indefinite since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. One could not tell from such a claim if the narrower range or limitation is a restriction or limitation on the broader range or limitation. The claim notes a triggering unit of a fuel injection valve **in particular** a common-rail injection valve. The broader range is the triggering unit, and the narrower limitation is a common-rail injection valve.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 12, 18, 27 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Frank et al. (US 6,705,587). Frank et al. show a piezoelectric actuator module, comprising at least one piezoelectric component (2), one actuator foot (not shown), and one actuator head (4) which head cooperates with a component to be actuated by the piezoelectric component (2), a bush (not numbered) extending in the axial direction and surrounding the actuator module, and a diaphragm (not numbered) extending essentially in the radial direction and adjoining the actuator foot (4), the diaphragm being joined to the bush and having a curved cross section in the radial direction.

The curved cross section of the diaphragm has different radii of curvature.

The piezoelectric actuator module is installed as a triggering unit of a fuel injection valve (see TITLE), in particular a common-rail injection valve, of a motor vehicle.

Frank et al. show a method for installing a piezoelectric actuator module, which includes at least one piezoelectric component (2), one actuator foot (not shown) and one actuator head (4), which head cooperates with a component to be actuated by the piezoelectric component (2), and the actuator module is surrounded by a bush (not

Art Unit: 2834

numbered) extending in the axial direction, the method comprising closing the bush on its face end, on the side toward the actuator head (4) by means of a diaphragm (not numbered), which extends essentially in the radial direction,

Claim 28 is rejected under 35 U.S.C. 102(b) as being anticipated by Ulrich et al. (DE 19909106). Ulrich et al. show (figs. 1-2b) a method for installing a piezoelectric actuator module, which includes at least one piezoelectric component (1), one actuator foot (top end of actuator) and one actuator head (2), which head (2) cooperates with a component to be actuated by the piezoelectric component (1), and the actuator module is surrounded by a bush (331-333) extending in the axial direction, the method comprising closing the bush on its face end, on the side toward the actuator head (2) by means of a diaphragm (32), which extends essentially in the radial direction,

Claims 12-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Voigt et al. (DE 10016247). Voigt et al. show a piezoelectric actuator module, comprising at least one piezoelectric component (2), one actuator foot (top of actuator), and one actuator head (3, 6) which head cooperates with a component to be actuated by the piezoelectric component (2), a bush (1) extending in the axial direction and surrounding the actuator module, and a diaphragm (4) extending essentially in the radial direction and adjoining the actuator foot (3, 6), the diaphragm being joined to the bush (1) and having a curved cross section in the radial direction.

The diaphragm (4) is welded to the actuator head (3, 6).

The diaphragm (4) is welded to the bush (1).

The diaphragm (4) is manufactured integrally with the bush (1). Note that as they are welded together they form an integral component. Additionally It would have been obvious to one of ordinary skill in the art to make the diaphragm and the bush integral since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1893).

The curved cross section of the diaphragm (4) has different radii of curvature.

They note the diaphragm having a thickness which may be within the range of between approximately 70  $\mu\text{m}$  and 200  $\mu\text{m}$ . See second paragraph of page 3.

The piezoelectric actuator module is installed as a triggering unit of a fuel injection valve (see TITLE), in particular a common-rail injection valve, of a motor vehicle.

Voigt et al. show a method for installing a piezoelectric actuator module, which includes at least one piezoelectric component (2), one actuator foot (top end of actuator) and one actuator head (3, 6), which head cooperates with a component to be actuated by the piezoelectric component (2), and the actuator module is surrounded by a bush (1) extending in the axial direction, the method comprising closing the bush (1) on its face end, on the side toward the actuator head (3, 6) by means of a diaphragm (4), which extends essentially in the radial direction.

The method further comprising welding the diaphragm (4) and the actuator head (7) together in load-free fashion.

***Claim Rejections - 35 USC § 103***

Art Unit: 2834

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 30-31, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over any of Frank et al. (US 6,705,587), Ulrich et al. (DE 19909106) and Voigt et al. (DE 10016247) in view of Miyoshi (US 5,272,797). Given the invention of Frank et al. and Ulrich et al. as noted above, they don't note welding the diaphragm. Given the invention of Voigt et al., they do not note subjecting the actuator foot to a preload in the direction of the piezoelectric component when welding.

Voigt et al. show a method for installing a piezoelectric actuator module, which includes at least one piezoelectric component (1), one actuator foot (top end of actuator) and one actuator head (bottom of actuator), and the actuator module is surrounded by a bush (8) extending in the axial direction, the method comprising closing the bush (8) on its face end, on the side toward the actuator head by means of a diaphragm (7), which extends essentially in the radial direction,

Miyoshi notes (col. 7, lines 18-41) that an actuator can be subject to preloading when a casing (bushing) is sealed by welding.

It is not clear that his actuator head cooperates with a component to be actuated by the piezoelectric component.

It would have been obvious to one of ordinary skill in the art to apply a preload of Miyoshi while making any of the Frank et al., Ulrich et al. or Voigt et al. inventions since

Art Unit: 2834

this allows for a means of selecting an amount of preload as deemed necessary.

Miyoshi notes that his design reduces the likelihood of the device breaking. See his

SUMMARY OF THE INVENTION.

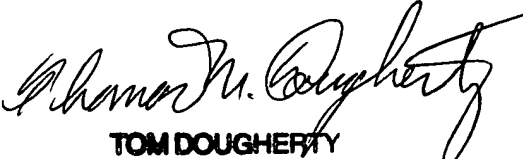
***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The remaining prior art cited reads on at least some aspects of the claimed invention.

Direct inquiry to Examiner Dougherty at (571) 272-2022.

tmd  
tmd

June 1, 2006

  
**TOM DOUGHERTY**  
**PRIMARY EXAMINER**